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AUTHOR Borg, Walter R.
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ABSTRACT

By comparing the first and fourth editions of a research methods text, the author identifies and discusses some major changes in educational research methodology that have occurred over the past 20 years. Some of the changes relate to ethics and legal constraints in conducting research, research and development, evaluation research, the availability of computerized literature searching, meta-analysis, new analysis methods, non-parametric statistics, observation, and research design. (Author/BW)

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Some Important Changes in Educational Research Methods Over the Past 20 Years

by

Walter R. Borg

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Last year the fourth edition of our research methods book was published, just 20 years after the first edition. When Patti Elmore asked me to participate in this symposium, it seemed that a comparison of the two volumes might give us some insights into changes in educational research that have occurred over this period.

Upon opening the first edition I encountered a small cloud of dust, evidence perhaps that many students find research methods to be a dry subject. Once the dust had cleared, the first impression was that the two volumes differed greatly in length. A bit of counting and multiplying revealed that the first edition came to about 163,000 words, while the 4th edition weighed in at 491,000--making it a bit over 3 times as long.

Just what factors contributed to this increase in length, I do not know. Perhaps part of it can be attributed to the fact that the authors learned more about research methods over the years. Part may demonstrate that it is easier to make a book longer than to make it shorter. However, I believe that most of this increase reflects a real increase in the body of knowledge that makes up educational research methods.

For those who like statistical trivia let me mention that the student who bought the book in 1963 got 274 words for a penny, while the buyer of the 4th

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edition gets 189 for his penny. Not a bad rate of inflation when you consider that in 1963 you could still buy a Hershey bar for a nickel.

I next looked at the chapter headings in the two volumes. Three chapters appear in the 4th edition that did not exist in the first. I would like to mention these briefly since I believe that they reflect important changes in our discipline.

The first deals with ethics and legal constraints in conducting educational research. This topic was totally absent from the first edition. I am sure we had some feel for research ethics in 1963. For example, I can recall a longitudinal study we conducted between 1957 and 1961 in which we took steps to maintain confidentiality of students' tests scores and other research data and offered to exclude students from the study upon a request from their parents.

However, all in all we lived in a less complex world in 1963 and I am sure that researchers, parents, and teachers were much more naive about the potential damage of research than is the case today. Few of us had given much attention to topics such as informed consent, deception, dehoaxing, and the more sophisticated ways of insuring confidentiality.

Another chapter in the 4th edition deals with educational R & D, a topic entirely absent from the first edition. I am sure that many of our younger colleagues will be surprised to learn that virtually nothing about the R & D process as applied to education was known 20 years ago. Test developers had used something similar in building and improving standardized measures but in areas like curriculum, the R & D cycle of develop-field test-and revise was not used. It was not until 1966, when the Regional Laboratories became operational that large numbers of educational researchers began to give serious thought to the development of a rigorous process of research and

development that could be used in building and evaluating educational products and processes.

The gains in Educational R & D seem highly significant to me for two main reasons. Perhaps most important is that developing the R & D process is the first effort by educational researchers that has succeeded in building a bridge between themselves and educational practitioners. For many years we heard both researchers and practitioners deplore the lack of communication between the two groups. By translating research findings into usable educational products, R & D has the potential to eliminate this problem. Another potential benefit of R & D which has been at least partially realized, is that it holds real promise of eventually placing educational change on a firm foundation of research and evidence instead of politics and fadism. Alas, we still have a long way to go in that direction.

The third new chapter from the 4th edition is concerned with Evaluation Research. This topic was a direct outgrowth of the work devoted to developing a viable educational R & D process, and many of the same scholars such as Michael Scriven, Jim Popham, Gary Borich, and Dick Schutz, have been concerned with both.

Both the first and fourth editions of our book contain chapters in other areas of educational research methodology such as reviewing the literature, sampling, and experimental design. However, the specific content of most of these chapters has changed greatly. Let us now look at a few of these changes that seem to me to reflect major changes in the research procedures we have at our disposal. Today, our "kit of tools" contains many procedures that were either generally unknown or non-existent in 1963.

In reviewing the literature in 1963 we were limited to tedious manual searches of Education Index, Psychological Abstracts, Dissertation Abstracts

and a few other sources on a volume-by-volume basis. The Cumulative Subject Indexes to Psychological Abstracts had not yet been compiled and the Comprehensive Dissertation Index was still 10 years in the future. Neither RIE or CIJE existed. Furthermore, the computer search procedures that most of us use today were still far in the future in 1963.

Most researchers who conducted reviews of research literature attempted to pull together their findings either by a subjective analysis of the quality of the studies they had reviewed or by some simple procedure such as counting the numbers of significant and non-significant finding relevant to their topics. Meta-analysis and other sophisticated procedures for combining research findings did not exist.

Although most of the statistical procedures we use today had been developed by 1963, a quick look at the research literature of that time shows that nearly all analyses were limited to a few simple tools such as the product moment correlation, the t-test and Chi Square. Factor Analysis and Analysis of Variance were employed in a few studies, but many well known tools in use today such as a path analysis, discriminant analysis, multiple regression analysis, and canonical correlation were virtually unknown. Since most research involved single variable experiments, descriptive studies, or correlational studies, the simple statistics then in use were reasonably adequate.

In 1963 the terms parametric statistics and non-parametric statistics were generally unknown to educational researchers. Although Siegels book had been published in 1956, educational researchers were slow to adopt non-parametric statistics even though these tools were clearly more appropriate for much of the data generated in educational research.

Several major changes have occurred in the kinds of measures available to the educational researchers. Following the publication of Mager's book in 1962, the importance of specific objectives in learning was recognized. Criterion-referenced measures, another development since 1963, have provided more accurate ways to measure these outcomes and to diagnose strengths and weaknesses.

Direct classroom observation has assumed much greater importance in educational research and has led to the development of a large number of systems and procedures to make observational data more valid and more objective.

Many studies of teaching that were conducted in the 50's and 60's assumed that certain things were taking place in certain classrooms without any direct observation to check these assumptions. In a typical study, the researcher would ask one group of teachers to use the inductive method to teach algebra while asking another group to use the deductive method. End-of-year achievement would then be compared in an attempt to evaluate the two teaching methods. No attention was given to what the teachers actually did in their classrooms or for that matter how they defined "inductive" and "deductive".

Although many have contributed to the demise of such research, I believe the work of Ned Flanders, which focused sharply on specific teacher and student behavior has perhaps done the most to make us realize the importance of direct classroom observation. In moving more in the direction of classroom observation, we have also adopted techniques from other behavioral sciences such as the use of ethnographic methods and participant observers.

Much of our gains in experimental research design and related topics such as quasi-experiments, internal validity and external validity must be credited to that monumental chapter by Campbell and Stanley that appeared in the

Handbook of Research on Teaching in 1963--just a few month's too late for the first edition of our text. Although I published my first research article in 1949, I find it difficult now to understand how I could have conducted research for 15 years without the benefit of the ideas that Campbell and Stanley presented. Their ideas have subsequently been expanded and clarified by other scholars, but I believe their 1963 chapter is probably the most important single event in the improvement of educational research methods that has occurred in the last 20 years.

Another major gain to which Campbell and Stanley contributed was the emergence of factorial designs and the related decrease in our dependence upon the classic single variable experimental designs that we inherited from the physical and biological sciences.

Another important change in educational research methodology has been the recognition that single subject designs have much to contribute to the attack of certain kinds of educational problems. Although Sidman's Tactics of Scientific Research gained a good deal of attention from psychologists when it was published in 1960, it was not until the 1970's that this methodology made any significant impact on educational research. I believe we should be making much more extensive use of single subject designs in educational research, especially for exploratory studies, and for experiments that involve sampling small populations such as the severely retarded. It seems to me that for the masters thesis the use of ABA or multiple baseline design with 3 or 4 replications in many cases provides the student with a better experience and produces better research than attempts to employ group designs when time, money and availability of subjects are all severely limited.

In summary, let me say that our knowledge of virtually all aspects of educational research methodology has greatly expanded in the past 20 years.

The methodologies of psychology, sociology, anthropology and education have been blended together into a single broad discipline which we can call behavioral science methodology. As educational researchers our kit of tools gets bigger and better with every passing year. We are better equipped to address the complex questions of education than ever before and should see many major breakthroughs in our understanding of the educational process by the end of the century.

Abstract

By comparing the first and fourth editions of a popular research methods text, the author identifies and discusses some major changes in educational research methodology that have occurred over the past 20 years.